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(54) Title: PLASMA PROCESSING APPARATUS

(57) Abstract

A chamber (2) has a side wall (8), the upper region of which is formed as a dielectric window (9). An antenna (10) is located outside of the dielectric window (9) and is used to couple RF power inductively into the plasma of an etchant or deposition gas which is formed inside the apparatus. A series of parallel tubes (11) are mounted in a plane parallel to the surface of a platen (6) carrying a wafer (7). Each tube contains a small permanent magnet or series of magnets. Electrons from the plasma created near the antenna (10) move into the region of influence of the magnetic field, are guided by the magnetic field and then lost, for example to the wall (8). The net result is a reduction in plasma density, on transmitting the magnetic field, from the region in which the plasma is produced to the region in which the wafer is placed. The magnetic field has no effect on the radicals, and the magnet carrying tubes have only a marginal effect on the radical numbers. Use of this magnetic attenuator allows high RF powers to be applied to the plasma source, producing the high numbers of radicals needed for a high etch rate, but limits the number of ions which can reach the wafer so that the physical component is homogeneous and well controlled.

